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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/683,329
Filing Date: December 14, 2001
Appellant(s): YU ET AL.

Melanie L. McCollum
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 22, 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Appellants note that an appeal was filed on November 17, 2004 for application 09/683,326, which has a similar specification and to which overlapping art has been applied, but which claims different subject matter. However, it is noted that there is no record of an appeal brief being filed and a telephone message inquiring whether or not it was actually filed left on December 16, 2004 went unanswered.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Up n

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Schlueter, Jr. et al.	U.S. Patent 5,549,193	8/27/96
Yu	U.S. Patent 5,688,355	11/18/97
Schlueter, Jr. et al.	U.S. Patent 5,942,301	8/24/99
Schlueter, Jr. et al.	U.S. Patent 5,997,974	12/7/99

Schlueter '193 is directed to a method of making a seamed belt that minimizes the thickness differential between the seamed portion of the belt and adjacent portions of the belt wherein the ends of the belt are shaped with laser to form joints that overlap, butt, and interlock; i.e. puzzle cut with rabbet tongues (Column 1, lines 23-26; Column 4, lines 46-57; Figures1-4).

Yu is also directed to a method of making a seamed belt using laser ablation that eliminates the excessive thickness of the seam overlap region present in the prior art wherein the ends of the support sheet are laser ablated to have complementary shapes, are overlapped and bonded together (Column 3, lines 16-19; Column 7, line 63 to Column 8, line 22).

Schlueter '301 is also directed to a method for making a seamed belt and teaches forming complementary puzzle cuts to ends of a sheet to be mated together with laser and teaches using a template to control the pattern/geometry (Column 3, lines 39-46 and Examples Table 1).

Schlueter '974 teaches making an invisible seam ("seamless") electrostatographic belt wherein the two ends of a support sheet are provided with mating puzzle cut patterns by laser ablating, are seamed together, and then the support sheet has a series of coatings applied to provide a smooth and "seamless" electrostatographic belt (Column 4, lines 24-26; Column 6, lines 61-64; Column 12, lines 42-44; Figure 10; Column 14, lines 55-67).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlueter et al (U.S. Patent 5,549,193) in view of Yu (U.S. Patent 5,688,355), Schlueter et al (U.S. Patent 5,997,974), and Schlueter et al (U.S. Patent 5,942,301).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to laser ablate the ends of the sheet so that when they are overlapped, butted, and interlocked there is substantially no added seam thickness in the method of Schlueter '193 as suggested in Yu in order to overcome the disadvantages of having a thickness differential between the seam and adjacent areas; to use first and second templates for defining the geometry to be laser ablated in the two ends of the sheet which prevent the laser from removing material under the template in the method Schlueter '193 as is well known and conventional in the art as suggested in Schlueter '301; and to apply a series of coatings to the seamed belt with

no added seam thickness as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt.

Schlueter '193 is directed to a method of making a seamed belt that minimizes the thickness differential between the seamed portion of the belt and adjacent portions of the belt wherein the ends of the belt are shaped with laser to form joints that overlap, butt, and interlock; i.e. puzzle cut with rabbet tongues (Column 1, lines 23-26; Column 4, lines 46-57; Figures1-4). While Schlueter '193 is directed to minimizing the thickness differential, there appears to still be a noticeable thickness differential (See Figures 2-4).

Yu is also directed to a method of making a seamed belt using laser ablation that eliminates the excessive thickness of the seam overlap region present in the prior art wherein the ends of the support sheet are laser ablated to have complementary shapes, are overlapped and bonded together (Column 3, lines 16-19; Column 7, line 63 to Column 8, line 22). This process results in a seamed belt have substantially no added seam thickness (See Figures 6b, 7b, 8b, and 9b). One skilled in the art would have readily appreciated that both Schlueter '193 and Yu teach the disadvantages of having a thickness differential in the seam area. In fact Schlueter '193 teaches in some applications the thickness differential needs to be less than .001 inches (Column 2, lines 25-27). One skilled in the art would have been motivated to laser ablate the ends of the sheet in Schlueter '193 so that when joined there is substantially no thickness added to the seam as taught in Yu. It would have been obvious to one of ordinary skill in the art at the time the invention was made to laser ablate the ends of the sheet so that when

they are overlapped, butted, and interlocked there is substantially no added seam thickness in the method of Schlueter '193 as suggested in Yu in order to overcome the disadvantages of having a thickness differential between the seam and adjacent areas.

Schlueter '193 is silent towards using a template when shaping the ends of the sheet with a laser, however such is well known and conventional as shown for example in Schlueter '301. Schlueter '301 teaches forming complementary puzzle cuts to ends of a sheet to be mated together with laser and teaches using a template to control the pattern (Column 3, lines 39-46 and Examples Table 1). While Schlueter '301 is silent towards whether or not the template prevents laser from striking the sheet under the template, one skilled in the art would have readily recognized using such a template in order to avoid removing material that is not supposed to be removed or damaging material. One skilled in the art would have readily appreciated that the template acts as a guide for shaping with the laser and that it is not desired for the material underneath the template to be struck with the laser and therefore also provides a protective function. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use first and second templates for forming the geometry to be laser ablated in the two ends of the sheet which prevents the laser from removing material under the template in the method Schlueter '193 as is well known and conventional in the art as suggested in Schlueter '301.

Schlueter '193 is also silent towards applying coatings over the seamed belt to make a "seamless" electrostatographic belt. It is well known and conventional to have electrostatographic belts and that there are numerous methods for forming such. One

method is taught in Schlueter '974 which teaches making an invisible seam ("seamless") electrostatographic belt wherein the two ends of a support sheet are provided with mating puzzle cut patterns by laser ablating, are seamed together, and then the support sheet has a series of coatings applied to provide a smooth and "seamless" electrostatographic belt (Column 4, lines 24-26; Column 6, lines 61-64; Column 12, lines 42-44; Figure 10; Column 14, lines 55-67). One skilled in the art would have readily appreciated that the method of Schlueter '974 has the advantage of making a seamless electrostatographic belt with a smooth and seamless surface. One skilled in the art would have readily appreciated coating the seamed belt with substantially no added seam thickness with a series of coatings as taught in Schlueter '974 in order to form a "seamless" electrostatographic belt. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a series of coatings to the seamed belt as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt.

In summation, it would have been obvious to one of ordinary skill in the art at the time the invention was made to laser ablate the ends of the sheet so that when they are overlapped, butted, and interlocked there is substantially no added seam thickness in the method of Schlueter '193 as suggested in Yu in order to overcome the disadvantages of having a thickness differential between the seam and adjacent areas; to use first and second templates for defining the geometry to be laser ablated in the two ends of the sheet which prevent the laser from removing material under the template in the method Schlueter '193 as is well known and conventional in the art as

suggested in Schlueter '301; and to apply a series of coatings to the seamed belt with no added seam thickness as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt.

Regarding claim 2, Yu teaches passing the laser through a mask (Column 17, lines 51-60).

Regarding claims 3-4, laser beams are electromagnetic radiation and particle beams.

Regarding claim 5, one skilled in the art would have readily appreciated that the laser beam can't reach the entire end portion to form all the features at once and that there necessarily needs to be relative motion between the laser and the sheet.

Regarding claim 6, Schlueter '974 teaches one of the layers applied to form an electrostatographic belt is a photoconductive layer (Column 12, lines 42-55).

Regarding claims 7 and 8, Schlueter '193 teaches it is conventional to use ultrasonic welding or adhesive to bond the ends together (Column 1, lines 55-58) and it would have been obvious to use such conventional means.

Regarding claim 9, Schlueter '301 teaches the templates are shaped in a puzzle cut pattern.

Regarding claim 11, the laser beam illumination process described in the claim is well known and conventional, as shown for example in Yu (See Figure 5) and it would have been obvious to use such conventional illumination means.

Regarding claim 12, Schlueter '301 teaches the templates are shaped in a puzzle cut pattern and Schlueter '193 teaches it is conventional to use ultrasonic welding to

bond the ends together (Column 1, lines 55-58) and it would have been obvious to use such conventional means.

Regarding claim 13, Schlueter '193 teaches it is conventional to use adhesive to bond the ends together (Column 1, lines 55-58) and it would have been obvious to use such conventional means.

Regarding claims 14-15 Schlueter '193 teaches a rabbeted joint (See Figures).

Regarding claim 17, one skilled in the art would have readily appreciated that the opposite surface of the opposite end would need to be shaped in order to have a rabbeted joint.

Regarding claim 18, Schlueter '974 teaches one of the layers applied to form an electrostatographic belt is a photoconductive layer (Column 12, lines 42-55).

Regarding claim 19, the support sheet of Schlueter '193 is a single layer of substantially homogeneous material.

Regarding claim 20, one skilled in the art would have readily appreciated that PET fits the parameters described for the flexible substrate sheet in Schlueter '193 (Column 4, lines 25-46).

Regarding claim 21, Schlueter '193 is silent towards using a mask, moving one of the laser and the sheet relative to the other, and applying a photoconductive layer. Yu teaches passing the laser through a mask (Column 17, lines 51-60). One skilled in the art would have readily appreciated that the laser beam can't reach the entire end portion to form all the features at once and that there necessarily needs to be relative motion between the laser and the sheet. Schlueter '974 teaches one of the layers applied to

form an electrostatographic belt is a photoconductive layer (Column 12, lines 42-55). It would have been obvious to use a mask, move one of the laser and the sheet relative to the other, and apply a photoconductive layer in the method of Schlueter '193, as modified above.

Regarding claims 22 and 23, Schlueter '193 teaches it is conventional to use ultrasonic welding or adhesive to bond the ends together (Column 1, lines 55-58) and it would have been obvious to use such conventional means.

(10) Response to Argument

It is preliminarily noted that in making a determination of obviousness, one must look at what the combined teachings of the references would have suggested to those of ordinary skill in the art. As stated in *In re Keller*, 642 F.2d 413,425, 208 USPQ 871, 881 (CCPA 1981):

> The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

In addition, it is well settled that with regard to the issue of obviousness, the combined teachings of the prior art as a whole must be considered. *EWP Corp. v. Reliance Universal, Inc.*, 755 F.2d 898, 907, 225 USPQ 20, 25 (Fed. Cir.), *cert. Denied*, 474 U.S. 843 (1985).

Appellants set forth three basic arguments. They argue there is no suggestion to (1) overlap the ends of the support sheet to produce a seamed belt having substantially

no added seam thickness; (2) place complementary templates over a support sheet to prevent emissions from striking the support sheet, thus preventing removal of material from under the templates; and/or (3) apply a coating over a seamed belt formed by overlapping the ends of a support sheet to form a "seamless" belt.

A. No Added Seam Thickness

Schlueter '193 is directed to a method of making a seamed belt that minimizes the thickness differential between the seamed portion of the belt and adjacent portions of the belt wherein the ends of the belt are shaped with laser to form joints that overlap, butt, and interlock; i.e. puzzle cut with rabbet tongues (Column 1, lines 23-26; Column 4, lines 46-57; Figures1-4). While Schlueter '193 is directed to minimizing the thickness differential, there appears to still be a noticeable thickness differential (See Figures 2-4).

It is not clear if the thickness differential depicted in the figures of Schlueter '193 falls within the meaning of the claimed language "substantially no added seam thickness", however the thickness differentials depicted in Figures of 6b, 7b, 8b, and 9b of Yu clearly have substantially no added seam thickness. Appellants' arguments to the contrary are not considered persuasive. Furthermore, the specification of the present application even cites Yu as teaching forming a seamed belt by "utilizing excimer laser ablation technique to remove precision amount of material from the bottom and top of two opposite ends of a imaging member cut sheet prior to overlapping the two opposite ends and ultrasonically weld the overlap into a welded seam. The resulting multi-layered imaging member belt thus obtained has a welded seam of little added thickness

(paragraph 0022)" **Appellants indicated in their specification that Yu teaches forming a seam of little (substantially no) added thickness.**

Furthermore, one skilled in the art would have readily appreciated that both Schlueter '193 and Yu teach the disadvantages of having a thickness differential in the seam area. In fact Schlueter '193 teaches in some applications the thickness differential needs to be less than .001 inches (Column 2, lines 25-27). **One skilled in the art would have been motivated to laser ablate the ends of the sheet in Schlueter '193 so that when joined that there was any degree of added seam thickness desired, including substantially no thickness added to the seam as suggested in the combined teachings of Schlueter '193 and Yu.** *See. In re Keller.* It would have been obvious to one of ordinary skill in the art at the time the invention was made to laser ablate the ends of the sheet so that when they are overlapped, butted, and interlocked there is substantially no added seam thickness in the method of Schlueter '193 as suggested in Yu in order to overcome the disadvantages of having a thickness differential between the seam and adjacent areas.

B. Templates

It is preliminarily noted that that **the use of the templates is described in the specification at a bare minimum**, being only mentioned in the abstract and in one sentence of paragraph 0066 as almost a side note and not depicted at all in the Figures. Accordingly, the lack of detailed description of the use of the templates in the present application is evidence that one of ordinary skill in the art would have known how to use a template in laser ablating to obtain the desired geometry for the ends of the support sheet.

Schlueter '193 is silent towards using a template when shaping the ends of the sheet with a laser, however such is well known and conventional as shown for example in Schlueter '301. Schlueter '301 teaches forming complementary puzzle cuts to ends of a sheet to be mated together with laser and teaches using a template to control the pattern (Column 3, lines 39-46 and Examples Table 1).

Schlueter '301 is cited as an example that it is well known and conventional to use a template for imparting a desired shape to a sheet with laser ablation. While Schlueter '301 is silent towards whether or not the template prevents laser from striking the sheet under the template, one skilled in the art would have readily recognized using such a template in order to avoid removing material that is not supposed to be removed or to avoid damaging material. One skilled in the art would have readily appreciated that the template acts as a guide for shaping with the laser to obtain the desired geometry and that it is not desired for the material underneath the template to be struck with the laser and therefore the template also provides a protective function.

Furthermore, one skilled in the art would have readily appreciated that the templates used on each end of the belt would be complementary in order to form complementary features on the belt which would facilitate forming the overlapping seam.

Appellants argue that Schlueter '301 does not teach using templates for making overlapping features. However, Schlueter '301 clearly teaches using templates for imparting a desired geometry to the ends of a sheet with laser ablation so the ends can be fitted together to form a seem. One skilled in the art would have readily appreciated that different types of geometries would require different templates. The combined teachings over Schlueter '193 to have overlapping features laser ablated into the ends of the sheets and the teachings of Schlueter '301 to use templates for controlling the desired geometry of the laser ablation clearly suggest the obviousness of using templates in laser ablating overlapping features into the ends of the sheet. *See. In re Keller.*

Appellants also argue that Schlueter '301 does not teach how the template is used. This argument is not found persuasive because **Appellants, as noted above, similarly do not describe the use of the templates in the present application and this is evidence that one of ordinary skill in the art would have known how to use templates in the laser ablating art.**

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use first and second templates for forming the geometry to be laser ablated in the two ends of the sheet which prevents the laser from removing

material under the template in the method Schlueter '193 as suggested in Schlueter '301.

C. Coating the Seamed Belt to Form a "Seamless" Belt

Schlueter '193 is silent towards applying coatings over the seamed belt to make a "seamless" electrostatographic belt. However, it is well known and conventional to have electrostatographic belts and that there are numerous methods for forming such.

Schlueter '974, which teaches one such method, is directed to making an invisible seam ("seamless") electrostatographic belt wherein the two ends of a support sheet are provided with mating puzzle cut patterns by laser ablating, are seamed together, and then the support sheet has a series of coatings applied to provide a smooth and "seamless" electrostatographic belt (Column 4, lines 24-26; Column 6, lines 61-64; Column 12, lines 42-44; Figure 10; Column 14, lines 55-67). One skilled in the art would have readily appreciated that the method of Schlueter '974 has the advantage of making a seamless electrostatographic belt with a smooth and seamless surface. One skilled in the art would have readily appreciated coating a seamed belt with substantially no added seam thickness with a series of coatings as taught in Schlueter '974 in order to form a "seamless" electrostatographic belt.

Appellants argue that Schlueter '974 teaches away from applying a series of coating to a seamed belt formed from overlapping sheet ends to make a "seamless" electrostatographic belt. This argument is not found to be persuasive. Appellant argues Schlueter '974 does not form a seamed belt from overlapping sheet ends because they

provide added seam thickness, however the present combination of references overcome this "disadvantage" by providing a seamed belt formed from overlapping sheet ends with substantially no added seam thickness.

Furthermore, **the combined teachings of the prior art suggest forming a "seamless" electrostatographic belt by applying a series of coatings over any seamed support sheet, including a seamed support sheet formed by overlapping ends of the support sheet to form a seam with substantially no added seam thickness.** *See. In re Keller.* The teachings of Schlueter '193 and Schlueter '974 when taken as a whole can be so combined.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a series of coatings to the seamed belt as suggested in Schlueter '974 in order to provide a smooth and "seamless" electrostatographic belt.

Conclusion

Appellants arguments are not found persuasive as there is sufficient motivation and suggestion to combine the art of record to (1) overlap the ends of the support sheet to produce a seamed belt having substantially no added seam thickness; (2) place complementary templates over a support sheet to prevent emissions from striking the support sheet, thus preventing removal of material from under the templates; and (3) apply a coating over a seamed belt formed by overlapping the ends of a support sheet to form a "seamless" belt.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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